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published in

International Environmental Agreements: Politics, Law and Economics
2003

DOI (link to publisher)

[10.1023/b:inea.0000005695.82669.d7](https://doi.org/10.1023/b:inea.0000005695.82669.d7)

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Kuik, O. J., Berkhout, F., & Wieczorek, A. J. (2003). Editorial introduction: Russian carbon and Europe's climate. *International Environmental Agreements: Politics, Law and Economics*, 3, 195-198.
<https://doi.org/10.1023/b:inea.0000005695.82669.d7>

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Editorial Introduction

Russian Carbon and Europe's Climate

Abundant, affordable and secure supplies of energy are vital for maintaining our present way of life, as is a stable climate. Energy, in all its useful forms, is essential for the sustainability of our society. It has been argued that it was essentially man's ability to exploit useful energy from fossil fuel resources that sparked-off and maintained the great societal transition that became known as the Industrial Revolution. This forged the economic fate of most of humankind, moving it from subsistence and vulnerability to increasing welfare and resilience. However, scientific research has revealed a number of complex links between energy use and environmental change on a global scale. These changes are becoming visible and are likely to be profound. Some human-induced global change appears to be accelerating in an unpredictable and difficult to understand way. With much at stake, societies face the need to develop creative response strategies; including reconsideration of the ways and means they meet primary human needs. Today, we may therefore be on the brink of yet another great transition, a transition towards more environmentally sustainable energy economies. Again, fossil fuels play a pivotal role in that transition. And as in the case of the Industrial Revolution, it may again be Europe where the foundations for the new transition are laid.

The energy industries in Europe are in flux. Traditional, national monopolies in the European electricity and gas markets are being dismantled, and markets are being deregulated and liberalised. The rationale for deregulation and liberalisation has been economic, with much less attention paid to the more 'political' notion of energy security. The oil crises of the 1970s put the issue of energy security high on political agendas, but as the 20th century progressed and drew to a close, governments' preoccupation with energy security faded. Policymakers are now faced with the questions: will the supply of abundant and affordable energy be as secure in the coming decades as it was in the past quarter of a century? And what will be the environmental costs? Starting with concerns over emissions from conventional pollutants, such as sulphur-dioxide and nitrous-oxides, and anxiety over safety, especially of nuclear power, the main issue today is the contribution of the generation and use of energy to emissions of greenhouse gases and to climate change. Many now believe that a more far-reaching approach is necessary. Such a response to a changing climate will probably require a fundamental transition of our energy economy, away from dependence on fossil fuels, and towards renewable sources and more efficient uses of energy.

Europe is playing a special part in the development of the international legal

instruments to deal with climate change, and in the development and promotion of policies and measures to reduce emissions of greenhouse gases. Europe is doing that in a time when its own political identity is in great flux. The coming, 'eastern' enlargement of the European Union – the reunification of the 'old' and the 'new' Europe – will challenge many existing institutions and policies, and have profound implications for European energy industries.

Europe's eastward expansion means that the large fossil fuel reserves of Russia and other countries of the former Soviet Union (FSU) become relatively more accessible and attractive as a means of powering Europe's future development. All global and regional energy forecasts predict that Europe will become increasingly dependent upon foreign sources of energy in the coming two or three decades. And in this light, the importance of stable and secure trade relations with Russia have long been recognised. Good relations are to the advantage of both Western and Eastern Europe. Russia has large deposits of natural gas which, being a low-carbon fuel, might assist Western Europe in reducing its emissions of carbon dioxide, the major greenhouse gas. Russia and Ukraine also have substantial resources of carbon emission rights that under the Kyoto flexible mechanisms can be traded.

If Europe is indeed at the brink of a major transition towards a sustainable society, how will Europe manage this transition? How will it reconcile the different and conflicting societal demands regarding the security, safety, affordability, and environment-friendliness of energy supply in the context of highly dynamic economic, technological and political change? And what role will the FSU's fossil fuel resources and tradable carbon intangibles play in that transition?

The EU-funded Carbon Flows Between Eastern and Western Europe research project (CFEWE) has been initiated within the IHDP (International Human Dimensions Programme) Industrial Transformation framework, which is concerned with the question of decoupling economic growth from its environmental burdens. Within the CFEWE project two contrasting visions of the future were developed to act as benchmarks and to guide an assessment of the future course of European energy and environmental policies. To focus the discussion, it was assumed that an enlarged EU (with 28 Member States) would make commitments to a carbon reduction target of 30 percent below 1990 emission levels by 2030. How could the EU28 reach this target? The two contrasting visions represent alternative strategies: one in which the EU maximises trade in Russian, Caucasian and central Asian low-carbon fuels (such as gas and biomass) and in carbon emission allowances and credits; the other in which the EU would reach its target primarily through 'domestic measures', requiring rapid improvements in energy efficiency and a drastic shift towards the production and use of renewable energy in the EU.

The *trading/interdependence* scenario assumes that the FSU can supply the EU's future need of low carbon fuels and emission credits. How realistic is this assumption? Will the FSU produce enough low-carbon energy carriers to meet demand, and would the FSU want to sell them to the EU? If so, what would be

the costs to the EU, both in a strict economic sense, but also in terms of greater dependency on the FSU for energy supplies? Under this scenario the EU's climate policy would also become dependent on the FSU as a supplier of tradable carbon rights. These two forms of dependency – energy dependency and dependency with respect to the implementation of climate change policy – can be combined in the new concept of *carbon dependency*.

The alternative strategy, the *autonomy/independence* scenario, also carries risks. Is the reduction target of 30 percent feasible? What would such a scenario require in terms of economic and technological innovation and adjustment, and what would be the costs? Would such a scenario reduce external energy dependency and hence improve the energy security of the EU? It is interesting in this respect to take a closer look at the special position of the Central and Eastern European countries who will be joining the EU. What is their reduction potential in the longer term and could they assist other EU countries in meeting a tough overall EU carbon reduction target, for example by emissions trading?

The papers in this issue elaborate on these and other questions arising in considering the alternative energy and climate policy strategies. In the opening paper, Berkhout and Smith quantify current carbon interdependences between the EU and the FSU. What is the size of these flows and what is their composition? Having established current flows, Berkhout and Smith define the contrasting scenarios sketched above, and explore some of their consequences. Their conclusions are that 30 percent cuts in CO₂ emissions by 2030 are feasible for the EU, but that neither an unconstrained trading, nor a fully implemented autonomy scenario are feasible, or attractive routes towards meeting that objective. While a 'middle way' combination of the two is a more likely outcome given the framing assumptions, even this would require substantially more policy- and market-induced change than is currently in train.

In the next paper, Kuik presents a quantitative policy analysis. Kuik employs a Computable General Equilibrium (CGE) model to assess the magnitude and composition of the carbon flows between the EU and the FSU in 2030 in the two scenarios, given the carbon reduction target of the EU. The paper also quantifies energy and carbon dependency for the two scenarios and, tentatively, assesses the implications of the alternative strategies on economic welfare in both regions. Kuik argues that, without major technological breakthroughs, the autonomy scenario is expensive, and neither induces a great shift towards the generation and use of renewable energy, nor significantly reduces the energy dependency of the EU, conventionally defined. The trading scenario is shown to be of economic benefit to both regions, but it also increases the EU's energy dependency, and especially its carbon dependency. The exceptionally high rate of carbon dependency presents major political, social and economic risks.

In these first two papers the supply of low-carbon fuels and/or carbon emission rights from the FSU have been more or less taken for granted. The next paper focuses on Russia and analyse its energy and climate policies, and the future of

its energy industries. Poussenkova presents an insiders' account of the Russian gas and oil industry and identifies the main driving forces that will shape its future. Poussenkova describes Russia as a country with 'an unpredictable past', so pointing up the huge uncertainties that surround the Russian energy industry and its future. Critical to Russia's future capacity to meet the EU's demand for energy and tradable carbon emissions rights will be foreign investment in new fields and infrastructures.

Finally, the special position of one of the EU Candidate Countries the Czech Republic is analysed by Sejak and Kupka. Sejak and Kupka analyse energy and climate policy in the Czech Republic. In recent years, the natural gas delivery system has been diversified and the Czech Republic has lessened its dependence on coal. Energy efficiency gains have been realised, but as the economy grows, changes in lifestyle may compromise these gains. Sejak and Kupka argue that the energy/GDP ratio in the Czech Republic is still above the EU average and does not seem to be converging on that average. On the basis of official forecasts it seems possible, however, that the Czech Republic could achieve a 30 percent reduction by 2030, and that it could participate in emissions trading. Sejak and Kupka offer some reflections on the design of such an emissions trading system in terms of efficiency and fairness.

Taken together, the papers in this issue present an insight into the problems of implementing the Climate Change Convention in a dynamic region where implementation is closely connected to a variety of other interests and concerns. In the area of climate change policy research, there is ample attention given to specific issues, such as the design of policy instruments, emissions trading and technological development of renewable energy sources, with much less attention paid to the broader political and economic contexts within which policies will unfold and make their effect. Sometimes, it is necessary to cast the net a little wider, and to examine the Convention within the larger context of societal transition. The papers in this issue do not aim to solve the governance questions at stake, but try to inform the debate and to present clearly the inherent trade-offs. We also hope they offer a challenge and an agenda for future research on socio-economic development trajectories that have significantly smaller burdens on environment.

Guest Editors

Onno Kuik, Frans Berkhout and Anna J. Wiczorek